Investigating Postoperative Urinary Retention: Risk Factors and Post-Surgical Outcomes in Total Joint Arthroplasty

Matthew Grosso, Maddie Powers, Zachary Grace[1], Barrett Torre[1], Laura Sanzari[2], Dorothy B Wakefield
[1]University of Connecticut, [2]Spine Institute of CT

INTRODUCTION:

Postoperative urinary retention (POUR) is a known complication after total joint arthroplasty (TJA), though it lacks consensus regarding its diagnostic criteria, prevalence, risk factors, and treatment of catheterization. Furthermore, the occurrence of this complication is expected to increase as the need for these elective surgeries continues to rise making this an area of interest to examine. This study aims to quantify the rate of POUR across three distinct definitions, identify risk factors, and measure 90-day postoperative complication rates associated with catheterization. We hypothesized that male sex would be the most prominent risk factor for the development of POUR and those who received indwelling urinary catheterization would be at the highest risk for complications in a 90-day postoperative period.

METHODS:

Utilizing a prospectively collected institutional database, a single-center TJA cohort was retrospectively reviewed between April 2014 and March 2023. POUR rates were quantified utilizing three different diagnostic criteria. The definitions included: (1) Postoperative bladder scan $\geq$500 milliliters (mL) (2) documentation of postoperative catheterization (3) Postoperative bladder scan $\geq$500 milliliters (mL) or documented postoperative catheterization. Patients found to have POUR were then treated following a bladder management protocol that dictated steps of catheterization. Variables of interest included age, sex, operative joint, body mass index (BMI), American Society of Anesthesiologists (ASA) score, Charlson Comorbidity Index (CCI) classification, and anesthesia type. Complications and urinary tract infections (UTIs) within 90 days of surgery were compared. In addition, using overall complication rates among POUR patients, utilization and type of catheterization was evaluated to determine significance.

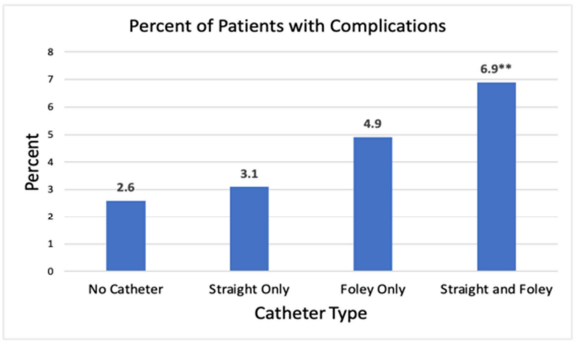
RESULTS:

Among the 17,220 TJA patients identified, POUR incidence rates based on diagnostic criteria varied from 20% (based on presence of catheterization), 25% (based on >500 ml in postoperative bladder scan), to 29% (catheterization and/or bladder scan). Advanced age, male gender, lower Body Mass Index (BMI), moderate Charlson Comorbidity Index (CCI) scores, undergoing Total Knee Arthroplasty (TKA), and receiving spinal anesthesia were significantly more prevalent among POUR patients (Table 1). The number of POUR patients who developed complications or UTIs within 90 days of surgery was not significant compared to patients without POUR. Among POUR patients, those who received a straight and indwelling catheterization were twice as likely (OR=2.02, 1.09-3.74) to develop complications compared to no catheterization ($p< 0.05$) (Figure 2).

DISCUSSION AND CONCLUSION:

The diagnosis of POUR across a variety of diagnostic criteria remains high following TJA. Patients who underwent catheterization for the management of POUR were twice as likely to develop complications in the postoperative period compared to those who were not catheterized. The decision to catheterize postoperative TJA patients with POUR should be weighed based on individual risk factors and should incorporate a multidisciplinary discussion among members of the providing team and patient. Implementing protocols to reduce catheterization rate may provide a viable prevention and risk reduction strategy for those predisposed to POUR following a TJA.

Figure 2: Percentage of complications by catheterization among POUR3 patients.



Figures/Tables:

Table 1: Number of patients (POUR3 vs non-POUR) by risk factor and overall complica

	Documented Catheter OR Bladder Scan at 600 ml		
Patient Characteristics	**No POUR n=12279**	**POUR n=4941**	**P-Value**
Age Group, n (%)			**<0.01**
<55	1312 (10.9)	448 (9.1)	
55-64	3628 (29.6)	1397 (28.3)	
65-75	4507 (36.7)	1931 (39.1)	
75+	2812 (22.9)	1165 (23.6)	
Sex, n (%)			**<0.01**
Female	7136 (58.12)	2684 (54.32)	
Male	5143 (41.88)	2257 (45.68)	
Body Mass Index, n (%)			**<0.01**
<25	1829 (14.90)	977 (19.77)	
25-29.99	4091 (33.32)	1766 (35.74)	
30-34.99	3451 (28.11)	1246 (25.22)	
35+	2907 (23.68)	952 (19.27)	
ASA Class, n (%)			**0.06**
I-II	8215 (66.94)	3380 (68.43)	
III-IV	4057 (33.06)	1559 (31.57)	
Charlson Comorbidity Index			**<0.01**
Mild (0-2)	5348 (43.55)	2046 (41.41)	
Moderate (3-4)	5710 (46.50)	2425 (49.08)	
Severe (5+)	1221 (9.94)	470 (9.51)	
Joint Replaced, n (%)			**<0.01**
Hip	5780 (47.07)	2098 (42.46)	
Knee	6499 (52.93)	2843 (57.54)	
Anesthesia Type*	**n= 11754**	**n=4694**	**<0.01**
Spinal	7216 (61.39)	3606 (76.82)	
Non-Spinal	4538 (38.61)	1088 (23.18)	
Any Complication			**0.58**
Yes	892 (1.19)	166 (3.96)	
No	11887 (96.81)	4775 (96.64)	
UTI within 90 days of surgery			**0.99**
Yes	62 (0.50)	25 (0.51)	
No	12217 (99.5)	4916 (99.49)	

*A portion of this cohort (n=2724.5%) was missing documentation of anesthesia type.